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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/254,119	04/16/1999	KOHEI TATSUMI	52433/545	6495

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KENYON & KENYON
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER

CHAMBLISS, ALONZO

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/254,119

Applicant(s)

TATSUMI ET AL.

Examiner

Alonzo Chambliss

Art Unit

2827

**- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-6, 16 and 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-6, 16 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-592) 4) ☒ Interview Summary (PTO-413) Paper No(s): 27.
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/25/03 in Paper No. 26 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 3-6, 16, and 17 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the metal balls are bonded to the electrodes with a flux must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 3-6, 16, and 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In claims 16 and 17, the phrase **the metal balls are only adhesive bonded to the electrodes with a flux** is not supported in the specification. Furthermore, on page 6 lines 17-24, applicant states that preferable a flux is used to adhesively bond the electrode to the metal ball. No, where in the specification can one find that **only** the flux is used to adhesive bond the metal ball. Therefore, claims 3-6, 16, and 17 are rejected under 35 U.S.C. 112, first paragraph.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 16 and 17, insofar as definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (JP 06-333930) in view of Okuaki (JP 63-117450) and Greer (US 5,470,787).

With respect to Claims 16 and 17, Matsumoto discloses a wafer 1 comprising electrodes (i.e. pad) formed on a wafer 1, and bumps 6 each consisting of a spherically formed metal ball having a given size and adhesive bonded to the electrodes for the attachment of the bumps 6. The metal balls of bump 6 are only adhesive bonded to the electrodes with a flux7 without reflowing (see English abstract and all figures). It is well known in the semiconductor industry that a wafer when cut forms unit semiconductor devices to form individual semiconductor chips as evident by Okuaki (JP 63-117450)(see English abstract and all figures). Therefore, Matsumoto discloses a semiconductor chip with an electrode attached to a metal ball by a flux, since a wafer when cut forms unit semiconductor devices to form individual semiconductor chips. Matsumoto does not explicitly discloses wherein each electrode includes a layer of an electrode material and at least one layer laminated to the layer of the electrode material to avoid deterioration of bonding such that the at least one layer has peripheral

dimensions substantially the same as or larger than those of the electrode. However, Greer discloses wherein each electrode 22, 36, 38 includes a layer of an electrode material 36 and at least one layer 38 laminated to the layer of the electrode material 36 to avoid deterioration of bonding such that the at least one layer 38 has peripheral dimensions substantially the same as that of the electrode 22, 36, 38. The at least one layer 38 has a thickness which is smaller than that of the electrode material 22 (see col. 4 lines 49-65 and col. 5 lines 11-50; Figs. 2, 5, and 6). Therefore, it would have been obvious to incorporate the electrode including a layer of electrode material and at least one layer laminated to the electrode material with the product of Matsumoto, since the combination of the layer of electrode material and at least one layer laminated to the electrode material would provide a stable electrical connection between the chip and the substrate as taught by Greer.

8. Claim 3-6, insofar as definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (JP 06-333930), Okuaki (JP 63-117450), and Greer (US 5,470,787) as applied to claims 16 and 17 above, and further in view of Yasunaga et al. (U.S. 5,656,863).

With respect to Claims 3-5, Matsumoto, Okuaki, and Greer all fail to disclose wherein the electrodes are formed from an electrode material of Al, at least and at least one metal layer made of Ti laminated to the electrode material layer and having a melting point higher than the electrode material, and at least one layer farthest from the electrode material layer is made of Sn. However, Yasunaga discloses wherein the electrodes 4 are formed from an electrode material of Al and at least one metal layer 12

laminated to the electrode material layer and having a melting point higher than the electrode material, and at least one layer farthest from the electrode material layer 8 is made of Sn (see col. 16 lines 55-67 and col. 17 lines 1-12; Figs. 17 and 18). Therefore, it would have been obvious to incorporate the electrode made of Al with and at least one metal layer laminated to the electrode material with a melting point higher than the electrode with the product of Matsumoto, Okuaki, and Greer, since the electrode and the at least one metal layer would provide a stable electrical connection between the chip and the substrate as taught by Yasunaga.


The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

Conclusion

9. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

AC/August 8, 2003


Alonzo Chambliss
Patent Examiner
Art Unit 2827